The diagnostic utility of stabilized blood for detection of foot-and-mouth disease virus RNA by RT-qPCR

S. Fontél, Kristina; Bøtner, Anette; Belsham, Graham; Lohse, Louise

Publication date:
2014

DTU Vet
National Veterinary Institute

The diagnostic utility of stabilized blood for detection of foot-and-mouth disease virus RNA by RT-qPCR

*Kristina S. Fontél, Anette Bøtner, Graham J. Belsham, Louise Lohse**

National Veterinary Institute, Technical University of Denmark, Lindholm, DK-4771 Kalvehave, Denmark

In Europe, clinical signs indicative of foot-and-mouth disease (FMD), would immediately lead to collection of blood and relevant organ material for further laboratory examination for this vesicular disease virus. Today, the first line system for detection of virus in the sample material is real time RT-PCR (RT-qPCR). The aim of this study was to investigate the diagnostic utility of stabilized blood for detection of FMDV RNA in this system.

Materials and Methods

EDTA-stabilized and unstabilized blood (serum) samples were collected from pigs and cattle during experimental studies. The cattle experiment included 13 animals (5 inoculated and 8 contacts) infected with serotype O FMDV. The pig experiment included 14 animals (4 inoculated and 10 contacts) infected with serotype A FMDV. All samples collected at days 0-15 post inoculation (dpi) were analysed after robotic extraction of RNA using RT-qPCR and the sensitivity of detection of FMDV RNA in the two different types of blood sample was compared.

Results

In the cattle experiment, 13/13 animals developed clinical signs (indicative of FMD) and viral RNA was detected in serum as well as in EDTA-stabilized blood samples from all animals (see fig. 1a and fig 1b for inoculated and contact animals, respectively).

In the pig experiment, 10/14 animals developed clinical signs and viral RNA was also detected in both sample types (see fig. 2a and 2b for inoculated and contact animals, respectively).

Results from these experiments showed a very similar profile of RNA detection but with, in general, slightly reduced sensitivity for EDTA-stabilized blood compared to serum.

Discussion

In this study, viral RNA from FMDV could be detected in both unstabilized and EDTA-stabilized blood, however, for EDTA-stabilized blood with slightly lower sensitivity. In the present set-up, it can therefore not be advised to use EDTA-stabilized blood for individual monitoring of FMDV infection in infected animals, however, on a herd basis (large sample size) this material will provide a clear picture of the overall FMDV infection status.

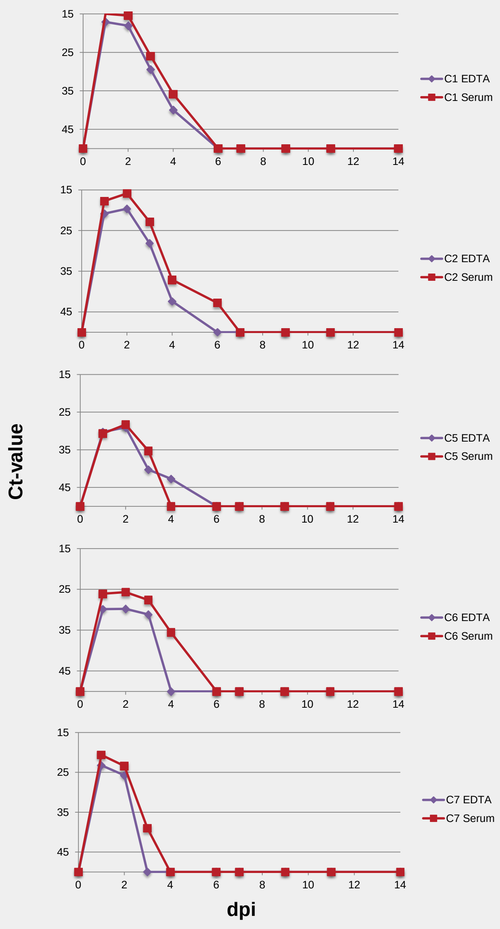


Figure 1a: Comparison of FMDV RNA by Ct-value in EDTA-blood and serum, **inoculated cattle**

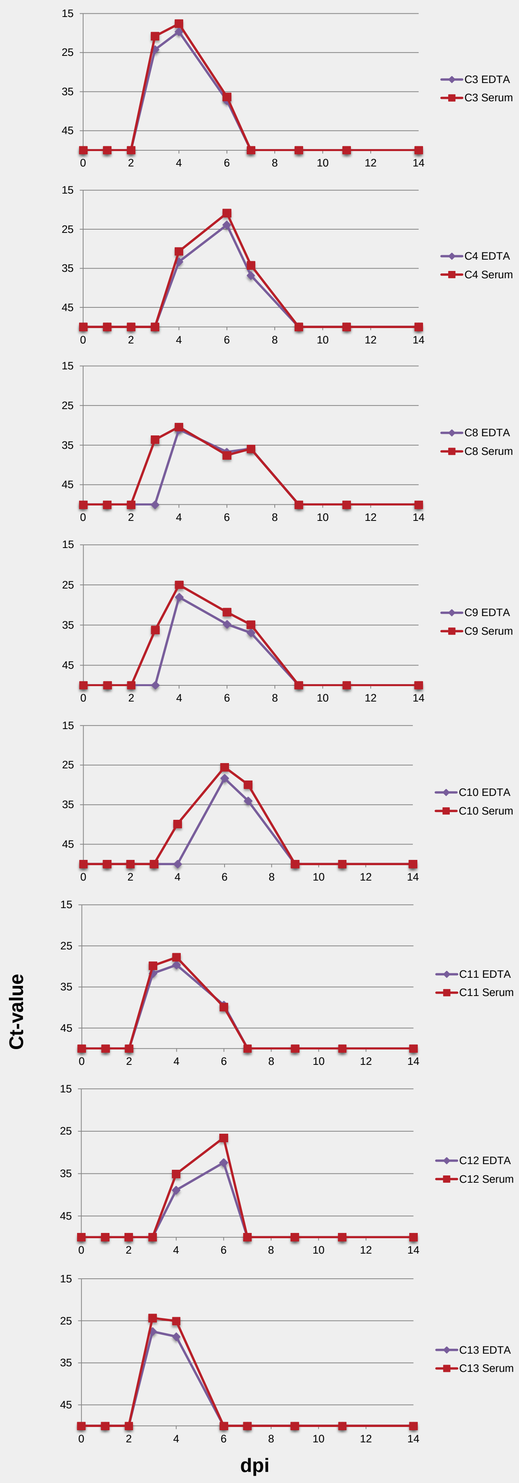


Figure 1b: Comparison of FMDV RNA by Ct-value in EDTA-blood and serum, **contact cattle**

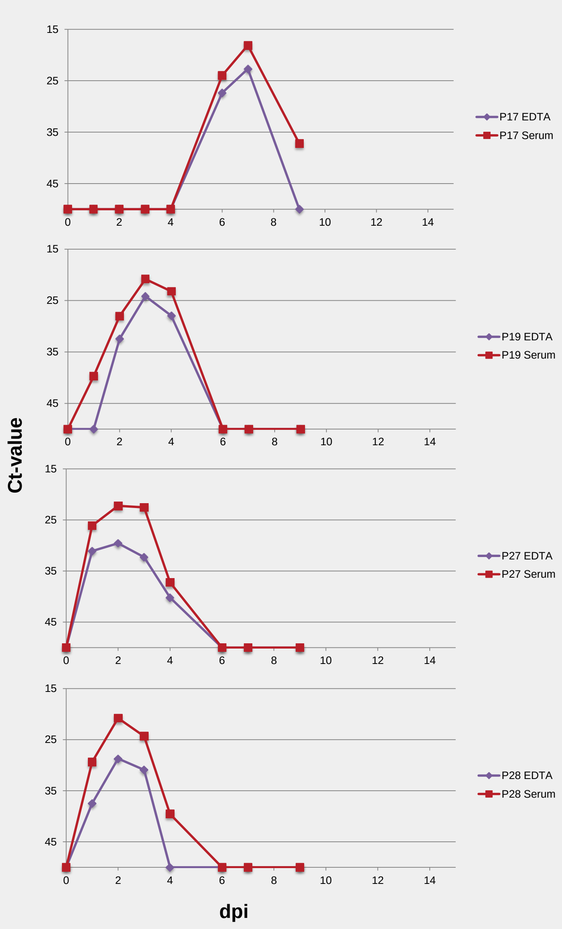


Figure 2a: Comparison of FMDV RNA by Ct-value in EDTA-blood and serum, **inoculated pigs**

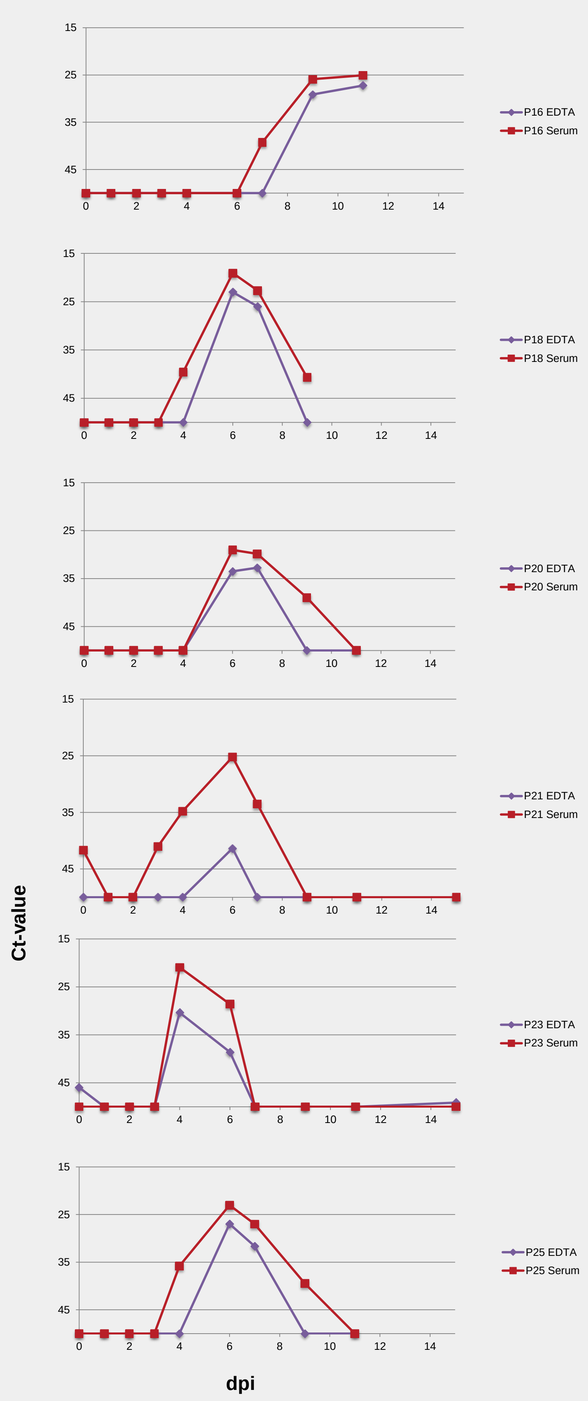
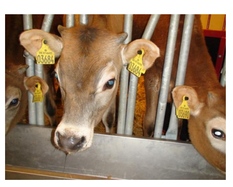


Figure 2b: Comparison of FMDV RNA by Ct-value in EDTA-blood and serum, **contact pigs**



Contact information

loloh@vet.dtu.dk